

THE GENUS *ZOGRAPHETUS* WATSON (LEPIDOPTERA: HESPERIIDAE) IN CHINA, WITH THE DESCRIPTION OF TWO NEW SPECIES¹

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ABSTRACT: Two new species, *Zographetus pangi* Fan and Wang sp. nov. from Nanling National Nature Reserve, Guangdong, and *Z. hainanensis* Fan and Wang sp. nov. from Yinggeling, Hainan, China, are described and illustrated. *Z. pangi* is allied to *Z. rama*, but can be easily separated from the latter by forewing lack of swollen vein in the male, and hindwing underside having dark brown spots, as well as the valva of male genitalia without pointed protruding in the upper margin of the harpal process. *Z. hainanensis* is closely related to *Z. pangi*, differing from the latter in having the small white spot in space M_2 on forewing upperside and that on underside more distinct, the spot in upper cell rather smaller; valva with the harpal process nearly rectangular, the upper margin nearly straight. Female genitalia of *Z. satwa* de Nicéville is described for the first time.

KEY WORDS: Lepidoptera, HesperIIDae, *Zographetus*, new species, China

The genus *Zographetus* was described by Watson in 1893 with *Isoteinion satwa* de Nicéville, 1884 as its type. The striking features of the genus are smaller size; palpi with the third segment short; forewing vein M_2 down-curved at its base, with ground color on upperside dark brown, and small white hyaline spots; hindwing underside with ground color ferruginous, and black spots in cell and postdiscal area. Based on forewing venation and secondary sexual characters, the genus includes two remarkable groups, e.g., the *Z. satwa* group and *Z. ogygia* group. The former comprises *Z. satwa*, *Z. rama*, *Z. abima* and *Z. pallens* with forewing vein Cu_2 arising much closer to the wing base than to vein Cu_1 , and the basal portion of vein Cu_2 and the cubitus are swollen in the male (de Jong, 1993); the latter is composed of the remaining species, with forewing vein Cu_2 arising slightly closer to vein Cu_1 than to the wing base, male without swollen vein (Eliot, 1992; de Jong, 1993).

The knowledge of the genus *Zographetus* from China has been summarized by Chou (1994), in which three species are included. Later, four species of the genus were reported from Hainan (Gu and Chen, 1998). Unfortunately, most of the species they recognized are misidentified.

Prior to the present study, only nine species are known in the genus (Bridge, 1994), ranging from northeastern India through southern China and the Malay Peninsula to the Philippines, Sulawesi and the Lesser Sunda Islands, of which one species, *Zographetus satwa* (de Nicéville, 1884) has been recorded in China. Recently, we conducted a systematic research of the genus from China based on our collection, and two species were confirmed as new to science.

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METHODS

The terminology used in descriptions of morphology follows Evans (1949) and Shirôzu (1960). Photographs were taken with a Nikon Coolpix 995 digital camera, along with a Leica MZ125 for genitalic photos. Digital images were imported into Adobe Photoshop 6.0 for labeling and plate composition. Measurements are given in millimeters.

Zographetus satwa (de Nicéville, 1884)

Isoteinon satwa de Nicéville, 1884: 86. (Type locality: Assam, India)

Zographetus satwa: Watson, 1893: 85; Seitz, 1927: 1067; Evans, 1949: 299; Pinratana, 1985: 71; Chou, 1994: 740; Gu and Chen, 1998: 329; Huang (Ed.), 2001, 4: 147.

Widespread species; hindwing underside with basal half yellow, distal half brown making it different from other congeners. Herein, we describe and illustrate the female genitalia for the first time.

Female genitalia (Fig. 1): Papilla analis completely sclerotized; lamella antevaginalis broad, with upper-lateral processes; lamella postvaginalis long and narrow rectangular, protruded medianly; ductus bursa short and sclerotized; copulatrix bursa long globular; signum absent.

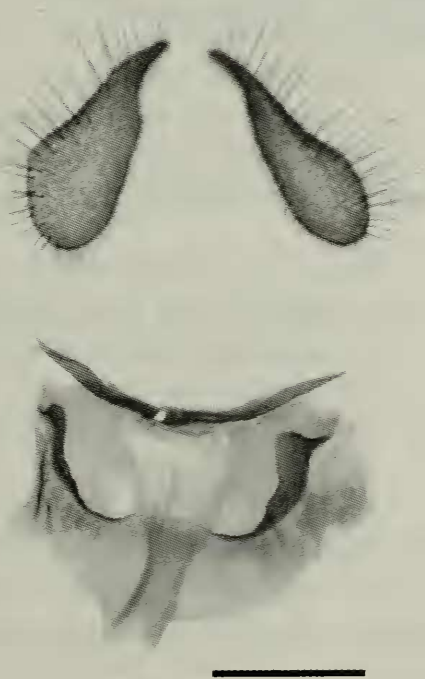


Fig. 1. Female genitalia of *Zographetus satwa* (de Nicéville, 1884), scale = 1 mm.

Examined Specimens: 1 male, China: Hainan, Jianfengling, 1983. III. 26, leg. M. B. Gu; 1 female, China: Yunnan, Mengla County, 1994. IV. 17, leg. X. L. Fan and M. Wang.

Distribution: Yunnan, Hainan, Hong Kong; Sikkim, India, Burma, Thailand, W. Malaysia, Sumatra, Java.

Zographetus pangi Fan and Wang, NEW SPECIES

(Figs. 2-3)

Diagnosis: Externally the new species is closely allied to *Z. rama* (refer to Eliot, 1992; Evans, 1949 for photos of adults and male genitalia), but can be distinguished from the latter by forewing with the spots in cell connected; hindwing underside with dark brown spots in spaces M_3 , Cu_1 , Cu_2 , and M_1 ; the valva of male genitalia without pointed protruding in the upper margin of the harpal process.

Description of the male: Forewing length 16 mm, antenna length 11 mm (Fig. 2).

Head. Antennae longer than 1/2 of forewing costa, dark brown with club pale yellow inwardly before the apiculus, which is pointed and hooked; palpi second segment porrect, densely covered with long yellow scales ventrally, third segment short and small.

Wing. Wings upperside with ground color dark brown. Forewing with orange hair tuft at the basal dorsum, and five white spots in spaces R_5 , M_3 , Cu_1 and cell, of which the double spots in cell connected and the one in space R_5 and upper cell rather small; hindwing unmarked. Forewing underside with ground color and white spots the same as of the upperside, covered with yellow brown scales along costa and at apex, small black spots in spaces M_1 and M_2 ; hindwing underside yellow, costa and termen dark brown, with small dark brown spots in the spaces M_3 , Cu_1 , Cu_2 , and M_1 , the one in space M_1 blurred, distal cell spot dark brown with yellow centrally.

Male genitalia (Fig. 3). Uncus long and thin with distinct fenestrula; socius and gnathos absent; saccus broad and long; valva nearly rectangular, the harpal process broad with upper margin wavy and armed with small spines basally, end blunt, the ampullar process thin and digit-shaped, shorter than the harpal process; aedeagus with subzonal sheath slim basally, suprazonal sheath stout; juxta U-shaped with a common base.

Female: Unknown.

Type Data: Holotype, male, China: Guangdong, Ruyuan, Nanling National Nature Reserve, 2003. VI. 12, leg. Min Wang and Guo-Hua Huang. Paratype, 1 male, same data as holotype. Deposited in Department of Entomology, South China Agricultural University, Guangzhou, Guangdong, China.

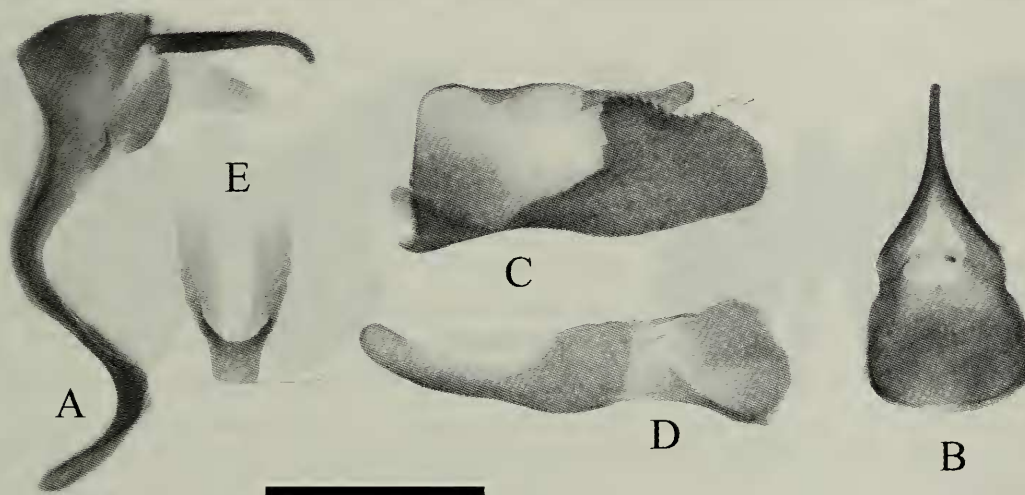
Host Plant: Unknown.

Distribution: Known only from the type locality.

Etymology of specific epithet: Named in honor of the late Prof. Xongfei Pang for his contributions to entomology in China.



Fig. 2. *Zographetus pangi* sp. nov. (scale = 10 mm) A. Dorsal view. B. Ventral view.



Figs. 3. Male genitalia of *Zographetus pangi* sp. nov. A. ring, lateral view. B. tegumen, dorsal view. C. valva, inner view. D. aedeagus. E. juxta. Scale = 1 mm.

Zographetus hainanensis Fan and Wang, NEW SPECIES

(Figs. 4-5)

Diagnosis: The new species is similar to *Z. rama* in appearance, differing from the latter in the small white spot in space M_2 on forewing upperside, and that on underside more distinct, the spot in upper cell rather small; hindwing with dark brown spots in spaces M_3 , Cu_1 and Cu_2 ; the valva of male genitalia without pointed protruding in the upper margin of the harpal process.

Description of the male: Forewing length 14 mm, antenna length 9 mm (Fig. 4).

Head. Antennae longer than 1/2 of forewing costa, dark brown with club pale yellow inwardly before the apiculus, which is pointed and hooked; palpi second segment porrect, densely covered with long gray scales ventrally, third segment short and small.

Wing. Wings upperside with ground color dark brown. Forewing with orange hair tuft at the basal dorsum, and white spots in spaces R_5 , M_3 , M_2 , Cu_1 and cell, of which the spots in space M_2 and upper cell very small; hindwing unmarked. Forewing underside with ground color and white spots the same as of the upperside, covered with yellow brown scales along costa and at apex; hindwing underside yellow brown, costa and termen dark brown, with small dark brown spots in the spaces M_3 , Cu_1 , Cu_2 , distal cell spot dark brown and comma-shaped.

Male genitalia (Fig. 5). Uncus long and thin with distinct fenestrula; socius and gnathos absent; saccus broad and long; valva broad and long, the harpal process nearly rectangular with upper margin straight and covered with small spines, the ampullar process thin and digit-shaped, shorter than the harpal process; aedeagus with subzonal sheath thinner than suprazonal sheath; juxta U-shaped with a common base, lateral arms broader.

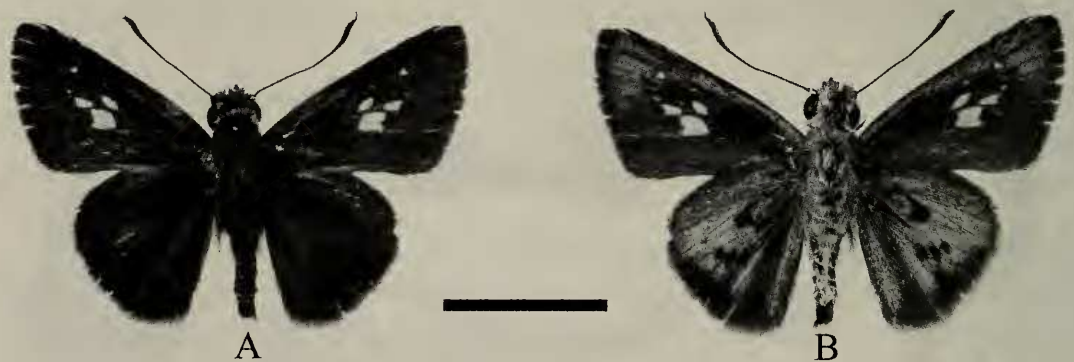


Fig. 4. *Zographetus hainanensis* sp. nov. (scale = 10 mm) A. Dorsal view. B. Ventral view.

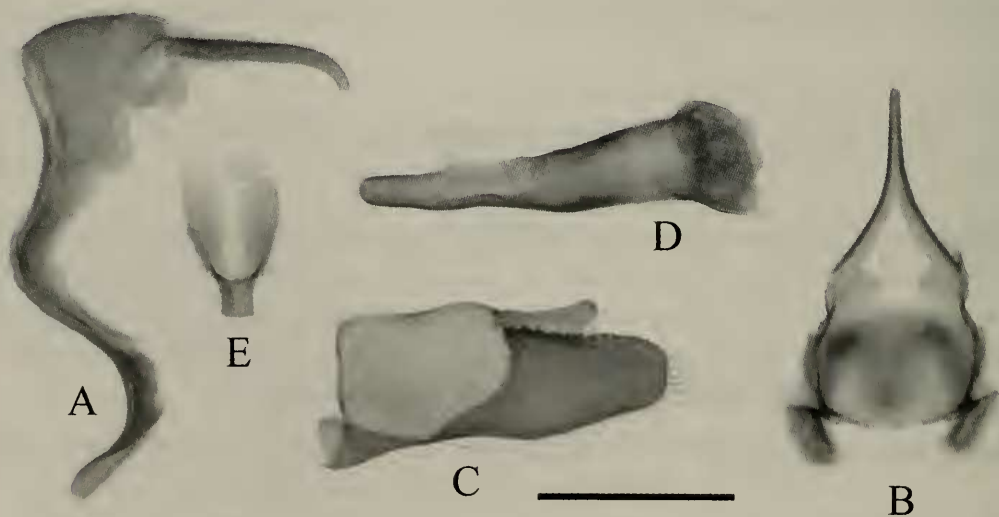


Fig. 5. Male genitalia of *Zographetus hainanensis* sp. nov. A. ring, lateral view. B. tegumen, dorsal view. C. valva, inner view. D. aedeagus. E. juxta. Scale = 1mm.

Female: Unknown.

Type Data: Holotype, male, China: Hainan, Yinggeling, 2005. V. 12, leg. Min Wang and Liu-Sheng Chen. Paratype, 1 male, same data as holotype. Deposited in Department of Entomology, South China Agricultural University, Guangzhou, Guangdong, China.

Host Plant: Unknown.

Distribution: Known only from the type locality.

Etymology of specific epithet: Referring to the type locality.

DISCUSSION

The genus *Zographetus* comprises a rather heterogeneous group of species, with differences in forewing venation and secondary sexual characters (Eliot, 1992). The two new species, *Z. pangi* and *Z. hainanensis*, share the following characters: forewing upper side with an orange hair tuft at the basal dorsum, vein Cu_2 arises slightly closer to the wing base than to vein Cu_1 , no veins are swollen in the male; hindwing underside with dark brown spots.

However, the latter differs from the former in forewing having the spot in upper cell rather smaller, while it is larger and distinct in *Z. pangi*; the spot in space M_2 is white on both sides in *Z. hainanensis*, while it is unmarked on upper-side and black on underside in *Z. pangi*; aedeagus with subzonal sheath is straight in *Z. hainanensis*, but it is bent in *Z. pangi*; valva with the dented upper margin of harpal process sinuated in *Z. pangi*, but it is straighter in *Z. hainanensis*.

Zographetus pangi and *Z. hainanensis* differ from the species in the *Z. ogygia* group by having the forewing upper side with an orange hair tuft, from the *Z. satwa* group by the forewing lack of a swollen vein in the male. The forewing upper side has a hair tuft, which is also present in *Z. rama*, but *Z. pangi* and *Z. hainanensis* are easily separated from the latter by forewing lack of swollen vein in the male, and hindwing underside having dark brown spots, as well as the valva of male genitalia without pointed protruding in the upper margin of the harpal process. Obviously, the two species are very different from all other species of the genus. Further studies are required to infer monophyletic lineage and the species group of the genus *Zographetus*.

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